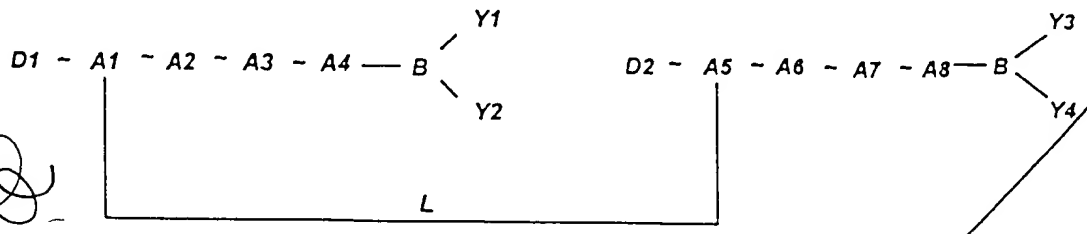
What is claimed is:

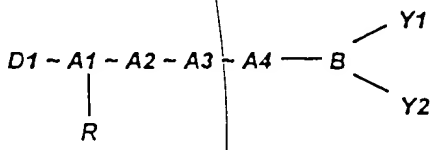
1. A compound, having the structure



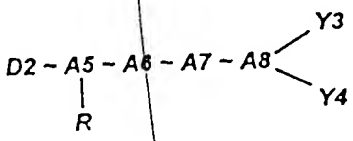
wherein D1 and D2, independently, are selected from the group consisting of NH and NH_2, wherein N represents any isotope of nitrogen, wherein H represents any isotope of hydrogen; "~", independently, is selected from the group consisting of a single bond and a double bond; B represents, independently, any isotope of boron; A1 and A5 are, independently, selected from a group consisting of a C, a CX moiety and an N, wherein C represents any isotope of carbon, wherein X represents any atom capable of forming a single bond with C; each A2, A3, A4, A6, A7, and A8 are, independently, selected from a group consisting of a CX moiety, a CXZ moiety, a CZ moiety, an NX moiety, and an O, wherein X and Z, are, independently, selected from the group consisting of any atom capable of forming a single bond and any atom capable of forming a double bond with C or N and wherein O represents any isotope of oxygen; wherein each Y1, Y2, Y3, and Y4 are, independently, selected from the group consisting of a hydroxyl moiety and any reactive moiety that converts to a hydroxyl moiety under physiologic conditions; and L represents a linker molecule (i) having a molecular weight ranging between about 100 daltons and about 2000 daltons, (ii) having a span ranging from about 20 Å to about

300 Å, and (iii) containing a chain of atoms selected from the group consisting of a combination of C, O, N, S, and Ph atoms, connected by single bonds or by double bonds in a manner that does not violate the laws of chemistry and wherein S represents any isotope of sulfur and Ph represents any isotope of phosphorous.

2. The compound of claim 1 wherein the following structures



and



represent, independently, a binding moiety, wherein R represents the remainder of the molecule.

3. The compound of claim 2 wherein there are 4 atoms positioned between the group consisting of D1 and D2 and B of the binding moiety.

4. The compound of claim 2 wherein the binding moiety is in an L-configuration.

5. The compound of claim 1 wherein **Y1**, **Y2**, **Y3**, and **Y4** are hydroxyl groups.

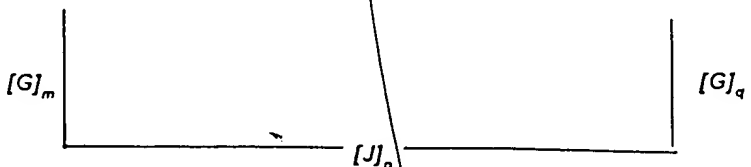
6. The compound of claim 1 wherein the **A4** bonded to the **B** is in the L-configuration and the **A5** bonded to the **B** is in the L-configuration.

7. The compound of claim 2 wherein the binding moiety is an L-amino acid residue conjugated to B, a boron molecule.

8. The compound of claim 2 wherein the binding moiety is selected from the group consisting of L-Lys-L-boroPro and a derivative of L-Lys-L-boroPro.

9. The compound of claim 1 wherein the linker molecule contains a functional group selected from the group consisting of a carboxylate group, an amino group, a sulfhydryl group, an imidazole group, an alkene group, an acyl halogen group, and CH_2X, wherein X represents a halogen.

10. The compound of claim 1 wherein the linker molecule is further defined as having the following structure:



wherein [G] is selected from the group consisting of a carbon, nitrogen, oxygen, hydrogen and a sulfur atom; [J] is selected from the group consisting of a CH_2 molecule, a chain of carbon atoms, a chain of nitrogen atoms, and a chain of oxygen atoms; and m, p, and q represent an integer from 1 to 50, inclusive.

11. The compound of claim 10 wherein [G] is an R group selected from the group consisting of L-amino acid residues selected from the group consisting of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine and D-amino acid residues selected from the group consisting of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine.

12. The compound of claim 1 wherein the linker molecule is selected from the group consisting of hexanedioic acid (adipic acid), EGS, 1,4-diaminobutane, 1,4-dithiobutane, dithiothreitol, lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine.

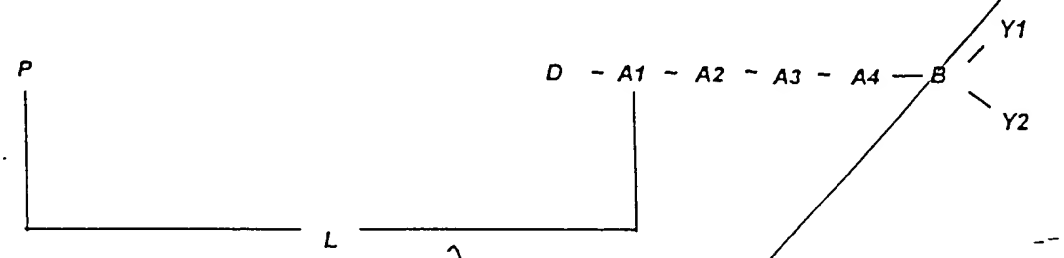
13. The compound of claim 1 wherein the linker molecule contains at least two amino groups when the binding moieties contain glutamic acid residues.

14. The compound of claim 1 wherein the linker molecule contains at least two amino groups when the binding moieties contain aspartic acid residues.

15. The compound of claim 1 wherein the linker molecule contains at least two sulfhydryl groups when the binding moieties contain cysteine residues.

16. The compound of claim 1 wherein the linker molecule span ranges from about 30 Å to about 100 Å.

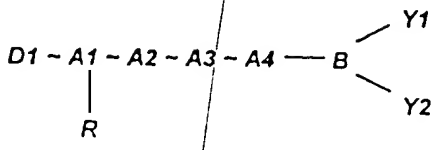
17. A compound, having the structure



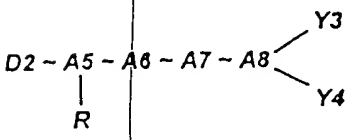
wherein **D** is independently selected from the group consisting of **NH** and NH_2, wherein **N** represents any isotope of nitrogen, wherein **H** represents any isotope of hydrogen; "~", independently, is selected from the group consisting of a single bond and a double bond; **B** represents, independently, any isotope of boron; **A1** is, independently, selected from the group consisting of a **C**, a **CX** moiety and an **N**, wherein **C** represents any isotope of carbon, wherein **X** represents any atom capable of forming a single bond with **C**; each **A2**, **A3**, and **A4** are, independently, selected from the group consisting of a **CX** moiety, a **CXZ** moiety, a **CZ** moiety, an **NX** moiety, and an **O**, wherein **X** and **Z**, independently, are selected from the group consisting of any atom capable of

forming a single bond and any atom capable of forming a double bond with **C** or **N** and wherein **O** represents any isotope of oxygen; wherein each **Y1** and **Y2** are, independently, selected from the group consisting of a hydroxyl moiety and any reactive moiety that converts to a hydroxyl moiety under physiologic conditions; **L** represents a linker molecule (i) having a molecular weight ranging between about 100 daltons and about 2000 daltons, (ii) having a span ranging from about 20 Å to about 300 Å, and (iii) containing a chain of atoms selected from the group consisting of a combination of **C**, **O**, **N**, **S**, and **Ph** atoms, connected by single bonds or by double bonds in a manner that does not violate the laws of chemistry and wherein **S** represents any isotope of sulfur and **Ph** represents any isotope of phosphorous; and **P** represents a peptide ranging from 3 to 30 amino acids having sufficient sequence homology to bind to a naturally occurring receptor.

18. The compound of claim 17 wherein the following structures



and



represent, independently, a binding moiety, wherein R represents the remainder of the molecule.

19. The compound of claim 18 wherein there are 4 atoms positioned between D and B of the binding moiety.

20. The compound of claim 18 wherein the binding moiety is in an L-configuration.

21. The compound of claim 17 wherein Y1 and Y2 are hydroxyl groups.

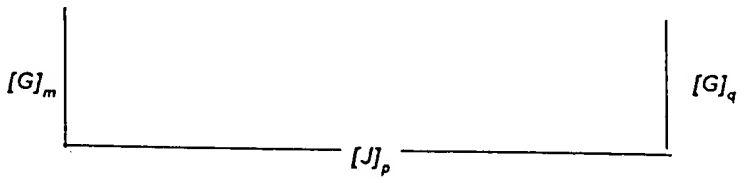
22. The compound of claim 17 wherein the **A4** bonded to the **B** is in the L-configuration.

23. The compound of claim 18 wherein the binding moiety is an L-amino acid residue conjugated to B, a boron molecule.

24. The compound of claim 18 wherein the binding moiety is selected from the group consisting of L-Lys-L-boroPro and a derivative of L-Lys-L-boroPro.

25. The compound of claim 17 wherein the linker molecule contains a functional group selected from the group consisting of a carboxylate group, an amino group, a sulfhydryl group, an imidazole group, an alkene group, an acyl halogen group, and CH_2X, wherein X represents a halogen.

26. The compound of claim 17 wherein the linker molecule is further defined as having the following structure:



wherein [G] is selected from the group consisting of a carbon, nitrogen, oxygen, hydrogen and a sulfur atom; [J] is selected from the group consisting of a CH_2 molecule, a chain of carbon atoms, a chain of nitrogen atoms, and a chain of oxygen atoms; and m, p, and q represent an integer from 1 to 50, inclusive.

27. The compound of claim 26 wherein [G] is an R group selected from the group consisting of L-amino acid residues selected from the group consisting of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine and D-amino acid residues selected from the group consisting of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine.

28. The compound of claim 17 wherein the linker molecule is selected from the group consisting of adipic acid, between 2 and 15 consecutive amino acid residues, 1,4-diaminobutane, 1,4-dithiobutane, and dithiothreitol.

29. The compound of claim 17 wherein the linker molecule span ranges from about 30 Å to about 100 Å.

30. The compound of claim 17 wherein the peptide ranges from about 7 to 25 amino acids.

31. The compound of claim 17 wherein the peptide is selected from the group consisting of:

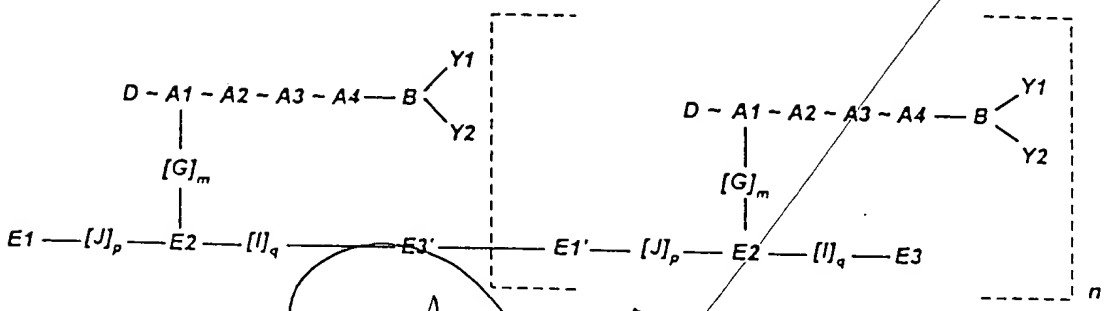
a) Myelin proteolipid protein peptide;
b) Moth cytochrome C peptide;
c) tetanus toxin;
d) HIV-1 GP 120 peptide;
e) myelin basic protein; and
f) HIV-1 GP 120 peptide.

32. The compound of claim 31 wherein the Myelin proteolipid protein peptide is selected from the group consisting of PLP peptide 139-151 and PLP peptide 190-209, the Moth cytochrome C peptide is peptide MCC 94-103, the myelin basic protein peptide is MBP peptide 1-11, and the tetanus toxin peptide is selected from the group consisting of tetanus toxoid peptide and P2 tetanus toxoid peptide. --

33. The compound of claim 17 wherein the naturally occurring receptor is a T cell surface receptor.

34. The compound of claim 33 wherein the T cell surface receptor is selected from the group consisting of TCR/C3, CD4, CD8, CD10, CD26, CD28, and CD45.

35. A compound, having the structure



wherein D is, independently, selected from the group consisting of NH and NH_2, wherein N represents any isotope of nitrogen, wherein H represents any isotope of hydrogen; "~" is, independently, selected from the group consisting of a single bond and a double bond; B represents, independently, any isotope of boron; A1 is, independently, selected from the group consisting of a C, a CX moiety and an N, wherein C represents any isotope of carbon, wherein X represents any atom capable of forming a single bond with C; each A2, A3, and A4 are, independently, selected from the group consisting of a CX moiety, a CXZ moiety, a CZ moiety, an NX moiety, and an O, wherein X and Z, independently, are selected from the group consisting of any atom capable of

forming a single bond and any atom capable of forming a double bond with **C** or **N** and wherein **O** represents any isotope of oxygen; wherein each **Y1** and **Y2** are, independently, selected from the group consisting of a hydroxyl moiety and any reactive moiety that converts to a hydroxyl moiety under physiologic conditions; **n** represents an integer between 1 and 200, inclusive;

wherein **E1** and **E3** are distinct reactive species in which:

(a) **R** and **R′** comprise the remainder of the molecules not relevant to this reaction;

(b) **E1** is attached to **R′** by a covalent bond which are together designated as **E1-R′** or **R′-E1**;

(c) **E3** is attached to **R** by a covalent bond which are together designated as **E3-R** or **R-E3**;

(d) **R′** represents the part of **E1-R′** not undergoing a chemical reaction;

(e) **R** represents the part of **R-E3** not undergoing a chemical reaction;

(f) **E1** undergoes a chemical reaction with **E3** to form the product **E1′-E3′** and a byproduct **F**, wherein **F** is selected from the group consisting of $2H^+$ and $2e^-$, H_2O, and any other byproduct;

(g) where H^+ is the cation of any isotope of hydrogen and e^- is an electron;

(h) where **H** represents any isotope of hydrogen and **O** represents any isotope of oxygen;

(i) where **E1′** and **E3′** are covalently bonded;

(j) **E1** does not undergo a chemical reaction with another **E1**;

(k) **E3** does not undergo a chemical reaction with another **E3**; and

(l) **E1** and **E3** are selected from the group consisting of a carboxylate, amino, imidazole, sulfhydryl, aldehyde, ester, and any other reactive species;

wherein **[J]p**, **E2**, **[I]q** and **[G]m** together comprise a linker moiety, and wherein **[G]m**, **[J]p**, and **[I]q** represent, independently, linker molecules (i) having a molecular weight ranging between about 100 daltons and about 2000 daltons, (ii) having a span ranging from about 20 Å to about 300 Å, and (iii) containing a chain of atoms selected from the group consisting of a combination of **C**, **O**, **N**, **S**, and **Ph** atoms, connected by single bonds or by double bonds in a manner that does not violate the laws of chemistry and wherein **S** represents any isotope of sulfur and **Ph** represents any isotope of phosphorous; and wherein **m**, **p**, and **q** represent, independently, an integer from 1 to 50, inclusive;

and wherein **E2** is selected from the group consisting of **CX**, **CH**, **N**, **PhYZ**, **PhU**, and any other moiety capable of forming covalent bonds with $[J]_p$, $[G]_m$, and $[I]_q$ and wherein:

(a) **C** is any isotope of carbon;

(b) **X** is any isotope of any atom capable of forming a single bond with carbon;

(c) **H** is any isotope of hydrogen;

(d) **N** is any isotope of nitrogen;

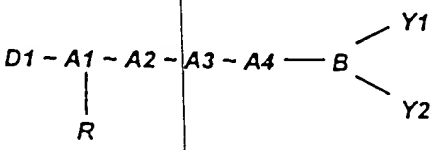
(e) **Ph** is any isotope of phosphorous;

(f) **Y** is any isotope of any atom capable of forming a single bond with phosphorous;

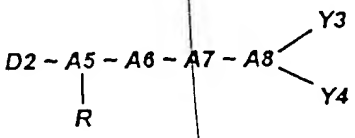
(g) **Z** is any isotope of any atom capable of forming a single bond with phosphorous; and

(h) U is any isotope of any atom capable of forming a double bond with phosphorous.

36. The compound of claim 17 wherein the following structures



and



represent, independently, a binding moiety, wherein R represents the remainder of the molecule.

37. The compound of claim 35 wherein (a) [G]m is the side chain of a D- or L- isomer of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine; (b) E2 is D- or L- isomer of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine; (c) E1 and E3 are

selected from the group consisting of an amino moiety and a carboxylic acid moiety; and (d) **E1** and **E3** are distinct from each other.

38. The compound of claim 35 wherein (a) **[G]m** is the side chain of a D- or L- isomer of lysine, cysteine, glutamic acid, aspartic acid, histidine, arginine, glutamine, and asparagine; (b) **E2** is selected from the group consisting of 2-carboxybutyl, 2-carboxypropyl, 2-aminobutyl, 2-aminopropyl, and a hydrocarbon chain with an amino or carboxy side chain; (c) **[J]p** and **[I]q** represent, independently, hydrocarbon chains; (d) **E1** and **E3** are selected from the group consisting of an amino moiety and a carboxylic acid moiety; and (e) **E1** and **E3** are distinct from each other.

39. A method for stimulating activation or proliferation of human CD26-bearing lymphocytes, said method comprising contacting said lymphocytes with a proliferation or activation-inducing concentration of the compound of any of claims 1, 17, or 35.

40. The method of claim 39, wherein said contacting is carried out by administering said compound to a human patient suffering from a disease state characterized by inadequate lymphocyte activation or concentration.

41. The method of claim 40, wherein said disease state is caused by HIV infection.

42. The method of claim 40, wherein said compound is administered in conjunction with a second, different agent which stimulates activation or proliferation of said lymphocytes.

43. The method of claim 40, wherein said compound is administered orally.

44. The method of claim 39, wherein said contacting of lymphocytes with said compound is carried out *in vitro*.

45. The method of claim 40, wherein said disease state is a neoplasm, and said CD26-bearing lymphocytes are cytolytic T cells.

46. The method of claim 40, wherein said patient is suffering from side effects of chemotherapy, one of which side effects being depletion of lymphocytes.

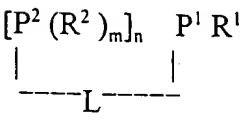
47. The method of claim 40, wherein said patient suffers from kidney failure resulting in depletion of lymphocytes.

48. The method of claim 40, wherein said patient suffers from a bone marrow disorder resulting in lymphocyte depletion.

Add a2

Add C1

49. A compound having the formula I:



(I)

wherein P^1 represents a first targeting moiety that mimics the substrate binding site of a protease expressed on the surface of a cell involved in immune system modulation;

R^1 represents a reactive group that reacts with a functional group in the reactive center of the protease;

P^2 represents a second targeting moiety that may be the same or different from the first targeting moiety;

R^2 represents a second reactive group that may be the same or different from the first reactive group;

m = 0 or 1 and n = a whole number from 1 to 10.

50. The compound of claim 49, wherein P^2=P^1 and R^2 is absent or is different from R^1.

51. The compound of claim 49, wherein P^1 selectively binds to a DP IV on a first cell and P^2 selectively binds to a major histocompatibility molecule on an antigen presenting cell.

52. A vaccine comprising the compound of claim 51.

53. A pharmaceutical composition comprising the compound of claims 1, 17, 35 or 49, in a pharmaceutically acceptable carrier.

54. A method for manufacturing a pharmaceutical composition comprising:

placing the compound of claims 1, 17, 35, or 49 in a pharmaceutically acceptable carrier.

55. The method of claim 39, wherein administering comprises obtaining the T cells, bone marrow cells, stem cells or early lineage progenitor cells from the subject, contacting the isolated T cells with the compound ex vivo in an amount effective to stimulate the T cells, and reintroducing the T cells to the subject.

56. A method for treating an autoimmune condition comprising:

administering the compound of claims 1, 17, 35, or 49 to a subject in need of such treatment in an amount effective to inhibit the autoimmune condition in the subject

ADD A2

add 26